

CLAIMS

What is claimed is:

- 5      1.      A method for use at a gateway node in a converged telephony / data  
network environment for communicating operating status information  
associated with nodes in a signaling system 7 (SS7) telephony signaling  
network of the converged network to nodes in a data network of the  
converged network, the method comprising:
- 10      (a)      receiving an SS7 message transfer part (MTP) network  
management message that includes operating status information  
associated with an SS7 node residing in the SS7 signaling  
network;
- 15      (b)      in response to receiving the SS7 MTP network management  
message, generating a data network management message  
including at least some of the operating status information; and
- 20      (c)      sending the data network management message to nodes in the  
data network that are adapted to communicate with the SS7  
network.
- 25      2.      The method of claim 1 wherein the data network is an Internet protocol  
network and sending the data network management message to nodes  
in the data network includes sending the data network management  
message to specific nodes in the IP network.

3. The method of claim 1 wherein generating a data network management message includes generating a transport adapter layer interface (TALI) message.
- 5 4. The method of claim 1 wherein generating a data network management message includes generating a stream control transmission protocol (SCTP) message.
- 10 5. The method of claim 1 wherein generating a data network management message includes generating a point code unavailable (PCUA) message for indicating unavailability of a point code in the SS7 network.
- 15 6. The method of claim 1 wherein generating a data network management message includes generating a point code available (PCAV) message.
- 20 7. The method of claim 1 comprising receiving a point code audit (PCAUD) message from one of the nodes in the data network, wherein sending the data network management message to nodes in the data network includes sending the data network management message to the node that originated the PCAUD message.
8. The method of claim 1 comprising receiving a point code congestion status audit (CONGAUD) message from one of the nodes in the data

network and wherein sending the data network management message includes sending the data network management message to the node that originated the CONGAUD message.

- 5      9.      The method of claim 1 wherein generating a data network management message includes generating a session initiation protocol (SIP) message.
- 10      10.      The method of claim 1 wherein receiving an SS7 message transfer part (MTP) network management message includes receiving a transfer prohibited (TFP) message.
- 15      11.      The method of claim 1 wherein receiving an SS7 message transfer part (MTP) network management message includes receiving a transfer allowed (TFA) message.
- 20      12.      The method of claim 1 wherein receiving an SS7 message transfer part (MTP) network management message includes receiving a transfer restricted (TFR) message.
13.      The method of claim 1 wherein receiving an SS7 message transfer part (MTP) network management message includes receiving a transfer controlled (TFC) message.

14. The method of claim 1 including sending the data network management message to a specific node in the data network that requested the operating status information associated with the SS7 node.

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15. The method of claim 1 including sending the data network management message to all nodes in the data network that are adapted to communicate with the SS7 node.

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16. A method for use at a gateway node in a converged telephony / data network for distributing operating status information associated with a node in a signaling system 7 (SS7) network of the converged network to nodes in a data network of the converged network, the method comprising:

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- (a) receiving an SS7 network management message including operating status information associated with an SS7 node;
- (b) performing a routing key database lookup using information contained in the SS7 network management message and identifying a node in the data network capable of communicating with the SS7 node; and

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- (c) communicating the operating status information to the identified node in the data network.

17. The method of claim 16 wherein communicating the operating status information to the identified node in the data network includes communicating the operating status information to an IP node in an Internet protocol (IP) network.

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18. The method of claim 17 wherein communicating the operating status information to an IP node in an IP network includes communicating the operating status information in a transport adapter layer interface (TALI) message.

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19. The method of claim 17 wherein communicating the operating status information to an IP node in the IP network includes communicating the operating status information in a stream control transmission protocol (SCTP) message.

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20. The method of claim 17 wherein communicating the operating status information to an IP node in the IP network includes communicating a point code unavailable (PCUA) message.

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21. The method of claim 17 wherein communicating the operating status information to an IP node in an IP network includes communicating a point code available (PCAV) message.

22. The method of claim 16 comprising receiving a point code status audit message for requesting point code status information for the SS7 node from a node in the data network, and, in response to the request, communicating the point code status information to the requesting node.

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23. The method of claim 16 comprising receiving a point code congestion audit message from a node in the data network, the point code congestion audit message requesting point code congestion for the SS7 node and, in response to the congestion audit message, sending the point code congestion information to the requesting node.

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24. The method of claim 16 wherein communicating the operating status information includes communicating a session initiation protocol (SIP) message.

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25. The method of claim 16 wherein receiving an SS7 network management message includes receiving a transfer prohibited (TFP) message.

26. The method of claim 16 wherein receiving an SS7 network management message includes receiving a transfer allowed (TFA) message.

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27. The method of claim 16 wherein receiving an SS7 network management message includes receiving a transfer restricted (TFR) message.

28. The method of claim 16 wherein receiving an SS7 network management message includes receiving a transfer controlled (TFC) message.

5 29. The method of claim 16 wherein performing a routing key database lookup using information contained in the SS7 network management message includes performing a routing key database lookup using an SS7 destination point code (DPC) value extracted from the SS7 network management message.

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30. The method of claim 16 wherein performing a routing key database lookup using information contained in the SS7 network management message includes performing a routing key database lookup using an SS7 origination point code (OPC) value extracted from the SS7 network management message.

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31. The method of claim 16 wherein performing a routing key database lookup using information contained in the SS7 network management message includes performing a routing key database lookup using an SS7 service indicator (SI) value extracted from the SS7 network management message.

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32. The method of claim 16 wherein performing a routing key database lookup using information contained in the SS7 network management message includes performing a routing key database lookup using an SS7 circuit identification code (CIC) value extracted from the SS7 network management message.
33. The method of claim 16 wherein performing a routing key database lookup using information contained in the SS7 network management message includes performing a routing key database lookup using an SS7 subsystem (SSN) value extracted from the SS7 network management message.
34. The method of claim 16 wherein identifying a node in the data network capable of communicating with the SS7 node includes identifying a socket associated with the node in the data network.
35. A method for use at a gateway node in a converged telephony / data network for managing status information requests associated with a node in a signaling system 7 (SS7) network of the converged network that are made by nodes in a data network of the converged network, the method comprising:



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- 5 (a) receiving, from a first node in the data network, a first status audit message for requesting operating status of a second node in the SS7 network;
- (b) receiving, from a second node in the data network a second status audit message requesting the operating status of first node in the SS7 network;
- 10 (c) determining whether the second status audit message is received within a predetermined time period following receipt of the first status audit message; and
- (d) in response to determining that the second status audit message is received within the predetermined time period, discarding the second status audit message.
- 15 36. The method of claim 35 wherein receiving a first status audit message from a first node in the data network includes receiving a status audit message from an Internet protocol (IP) network node in an IP network.
- 20 37. The method of claim 36 wherein receiving a first status audit message from an IP node in an IP network includes receiving a transport adaptor layer interface (TALI)-formatted congestion audit message.

38. The method of claim 36 wherein receiving a first status audit message from an IP node in an IP network includes receiving a transport adaptor layer interface (TALI)-formatted point code audit message.
- 5 39. The method of claim 36 wherein receiving a first status audit message from an IP node in an IP network includes receiving a transport adaptor layer interface (TALI)-formatted cluster audit message.
- 10 40. The method of claim 35 wherein determining whether the second message is received within a predetermined time period includes determining whether the second message is received within 500 milliseconds of the first message.
- 15 41. The method of claim 36 wherein receiving a first status audit message from an IP node in the IP network includes receiving a stream control transmission protocol (SCTP)-formatted point code audit message.
- 20 42. The method of claim 36 wherein receiving a first status audit message from an IP node in the IP network includes receiving a stream control transmission protocol (SCTP)-formatted cluster audit message.
43. A signaling gateway comprising:

- 5 (a) a first communications module for receiving a signaling system 7 (SS7) network management message signaling unit (MSU) that includes SS7 point code status information for an SS7 node; and
- (b) a second communications module for generating a data network management message that includes the SS7 point code status information and for sending the data network management message to specified nodes in the data network that are configured to communicate with the SS7 node.
- 10 44. The signaling gateway of claim 43 wherein the data network is an Internet protocol network.
45. The signaling gateway of claim 43 wherein the first communication module is an SS7 link interface module (LIM).
- 15 46. The signaling gateway of claim 43 wherein the second communication module is an IP enhanced data communication module (eDCM).
47. The signaling gateway of claim 43 wherein the SS7 network management message is a transfer prohibited (TFP) message.
- 20 48. The signaling gateway of claim 43 wherein the SS7 network management message is a transfer allowed (TFA) message.

49. The signaling gateway of claim 43 wherein the SS7 network management message is a transfer controlled (TFC) message.

5 50. The signaling gateway of claim 43 wherein the data network management message is a transport adapter layer interface (TALI) message.

10 51. The signaling gateway of claim 43 wherein the data network management message is a point code unavailable (PCUA) message.

52. The signaling gateway of claim 43 wherein the data network management message is a point code available (PCAV) message.

15 53. The signaling gateway of claim 43 wherein the data network management message is a congested destination (CONGLVL) message.

20 54. The signaling gateway of claim 43 wherein the second data network management message is a stream control transmission protocol message.

55. The signaling gateway of claim 43 wherein the specific nodes in the data network are identified using routing key rules.

56. A signaling gateway comprising:

- (a) a routing key table for storing routing key information for identifying IP nodes in an IP network that are configured to communicate with an SS7 node in an SS7 network;
- (b) a status manager process for determining or receiving status information relating to the SS7 node; and
- (c) a communications module operatively associated with the routing key table and the status manager process for communicating the status information to IP nodes configured to communicate with the SS7 node using the routing key information.

57. A signaling gateway comprising:

- (a) a first communications module for receiving, from a first IP node having a first SS7 point code, a first congestion audit message for requesting congestion status of an SS7 node and for receiving, from a second IP node having the first SS7 point code, a second congestion audit message requesting congestion status of the SS7 node; and
- (b) a congestion abatement process for determining whether the second message is received within a predetermined time period of receiving the first message and, in response to determining that

the second message is received within the predetermined time period, discarding the second message.

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